
Development of Expert System for Troubleshooting and Repair of Techno P3 Android Smartphone

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ABSTRACT

The increasing use of android Smartphone and its associated faults has been a major concern by numerous users. The growing of information technology (IT) skills among the mobile phone repairer and users is high. The study therefore design and implement an expert system for troubleshooting and repair of Android Smartphone Techno P3 Model. The system was developed using Hypertext Markup Language (HTML), Hypertext Preprocessor (PHP) and MYSQL. The developed system can be operated by any android users; it is one of the latest productivity enhancement tools that can be used whenever there is a need to troubleshoot and repair android Techno P3 model. It is recommended that expert system application for troubleshooting and repair of Techno P3 that can run on mobile devices be developed.

Keyword: Android, Smartphone, Hypertext Markup Language, Hypertext Preprocessor, MYSQL

CISDI Journal Reference Format

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1. INTRODUCTION

The engineering age is impacting tremendously, and geometrically increasing its areas of application. The information revolution is radically changing the nature and quality of engineering work . The acceptance and usage of Android Smartphone Techno p3 model is increasing by individuals and organizations for various purposes. Considering the increasing techno p3 usage whenever it malfunctions there exist few maintenance experts available to troubleshoot and repair it, it has therefore become very imperative to develop expert system for Android smartphone Techno p3 which will guide an expert and non-expert through stepwise approach to diagnose and maintain his/her phone.

Expert Systems (ESs) is an intelligent applications which provides advice through conversation or dialog to its users. It is conducted between a user and the ES application. In case the smartphone develops a fault ,ES will be used to connect the phone to the system for necessary troubleshooting. When smartphone malfunctions, most times, it is difficult to trace the causes of such malfunctioning with respect to identified symptoms. Every user of smartphone should be able to fix minor faults developed by Smartphone, without any maintenance experts. Mostly, the faults are fixed by formatting or flashing. Flash ,an example of Diagnostic software can be used to trace the causes of the fault. However, the need for maintenance and repair services is needed for effective performance of any smartphone.

This paper therefore provides an expert system solution to the troubleshooting and repair of techno p3 android Smartphone, assembles the knowledge common to the diagnosis and maintenance of techno p3 model and develop the expert system for android smartphone for techno p3 model.

2. LITERATURE REVIEW

2.1 Theoretical Background

Android , a Google developed mobile Operating System (OS) .Primarily ,the OS which is based on the Linux kernel , was designed for touchscreen mobile devices such as tablets and smartphones. The interface of the OS is based on direct manipulation; its touch gestures loosely correspond to real-world actions such as pinching, tapping and swiping for manipulation of on-screen objects, this also include a virtual keyboard for inputting text. The variants of Android are used on game consoles, digital cameras, notebooks and other electronics. In 2007, the Open Handset Alliance which is a consortium of software, hardware and telecommunication companies and Android were devoted for the advancement of open standards for some mobile devices. Android was adjudged to be the largest installed base of all OS in 2015.

The popularity of Android is with technology companies which requires low-cost, ready-made, and customizable OS for high technology devices. Nowadays, Android is being used for foundation for community-driven projects because of its openness to use open-source code; newer features are added for advanced users, and this has encouraged the community of enthusiasts and developers. The existing Smartphone war between tech-companies has qualified Android to be target for patent litigation. (Andy Rubin, 2003).

2.2 Review of Related Works

Several programmers around the world have worked why and how to go about the process of development of Expert System for Android Smart Phone in order to provide effective and efficient expert system for smart phone. This part of this paper reviews some of the findings of researchers about the whole process. According to (Falaki *et al*, 2013), who recently worked on 'Smartphone Application Traffic and Their Impact on Power Consumption', in the study, data were collected from forty –three(43) users , and smartphone traffic was characterized based on traffic traces and possible reduction in power consumption was examined.

Firstly in the study, a large-scale measurement of Android Smartphones was presented and detailed analysis of origin, activity and energy drain of background applications and services was later focus on. Secondly, the usefulness of background activities in a way that is customized to each application and user was presented as new metric for characterization. Finally, HUSH , a novel technique was presented, its implementation on Android Smartphones was examined for reduction in energy consumption as a result of activities at background and show of its energy impact on the actual phones.

A study on the first large-scale measurement of energy drain on Android Smartphones was performed recently. Analysis was conducted on the breakdown of total daily energy drain into a number of smartphone components, and on the applications and services running on the smartphones. Implication of the findings on designers of application developers and components of smartphone was drawn . (Falaki *et al*, 2013). According to (Low *et al*, 2008), who worked on 'Mobile Islamic Medication Expert Systems', the work is one of the early implementations of expert systems on cell phones.

The related treatment for different types of sickness or illness from Quran and Hadith was presented in the study. The

application was implemented as two packages which are GUI package and expert system server package. The GUI package allows the patient to enter the symptom(s) then it transmits these entries to the Expert system running on the server where the knowledgebase, database and inference engine reside, for making necessary analysis on the symptoms to recommend a suitable treatment.

The GUI was implemented on mobile device using J2ME application development platform that was provided by Sun Microsystems' JAVA to target consumer devices and electronic appliances. (Low et al, 2008)

3. DESIGN OF THE NEW SYSTEM

Web-based system for Android Smartphone for Techno P3 Model was implemented using web-based for information storage, a middleware application and a client-side application. In view of the problems in the existing system, it is important to seek for an improvement. This improvement is computerized to troubleshoot the system. The new system is equipped with the following.

1. The machine is always rendering service.
2. Distance and accessibility is not a problem
3. The machine does not die
4. There is backup of the knowledge of the human expert

3.1 Input, Process and Output Design

This is the section that traps users input; the input will be supplied via the keyboard into the database. The following are the various forms that will be used to trap data from the user; Admin registration form, application form, application status, user form, faults, symptoms and possible solution. The data inputted has to be verified and sent to the database; this action is known as the process design phase. The process design verified all data inputted so as to ensure that it suits the criteria or protocol of the expert. The output design varies based on the criteria of selection. The output data can be of screen display from the program parameter or from the database (data storage). The following output design consist of android Smartphone (Techno p3) search, list of fault display and general information about the fault.

INFORMATION FLOWCHAT

USER

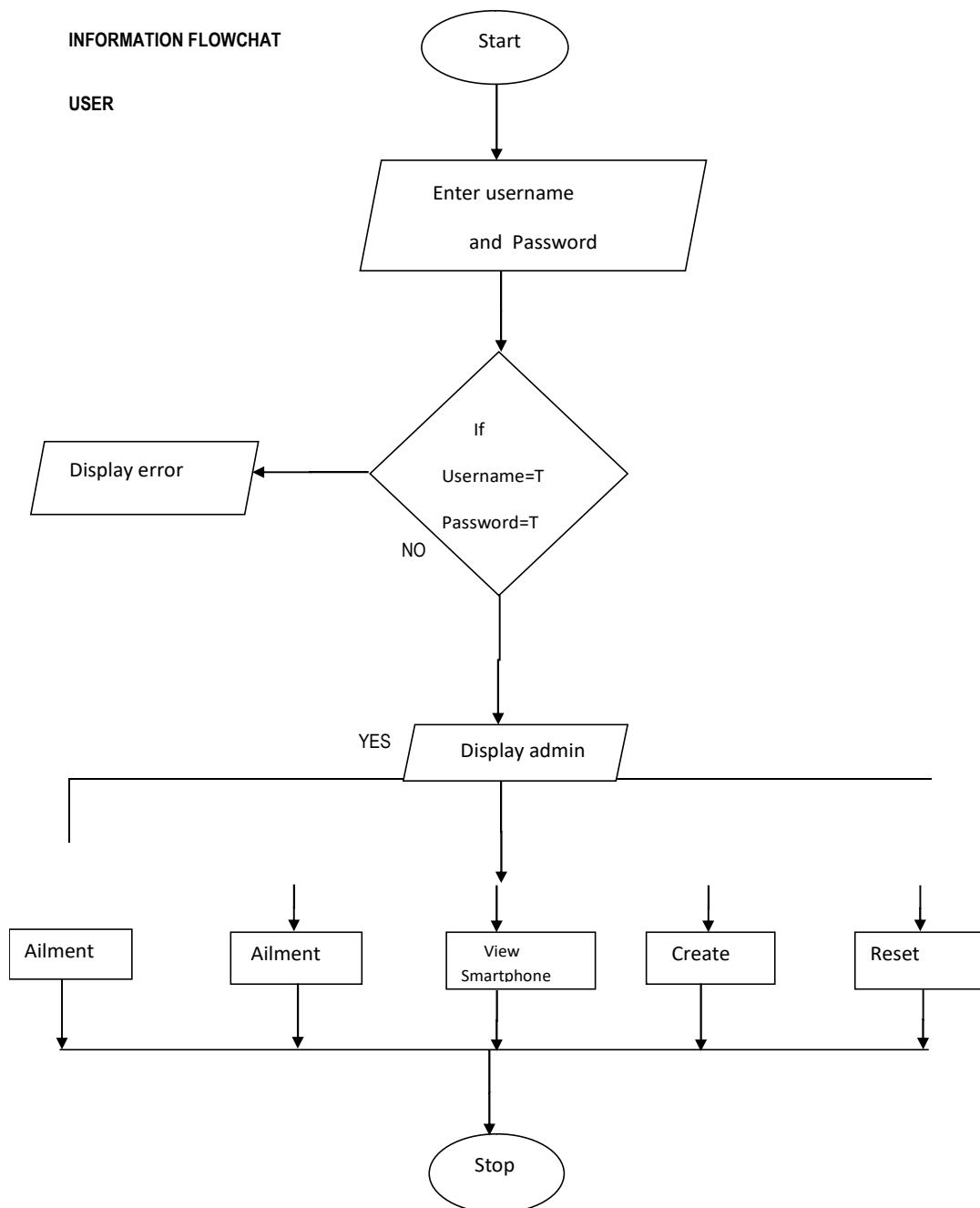


Figure 1: User

TROUBLESHOOTING

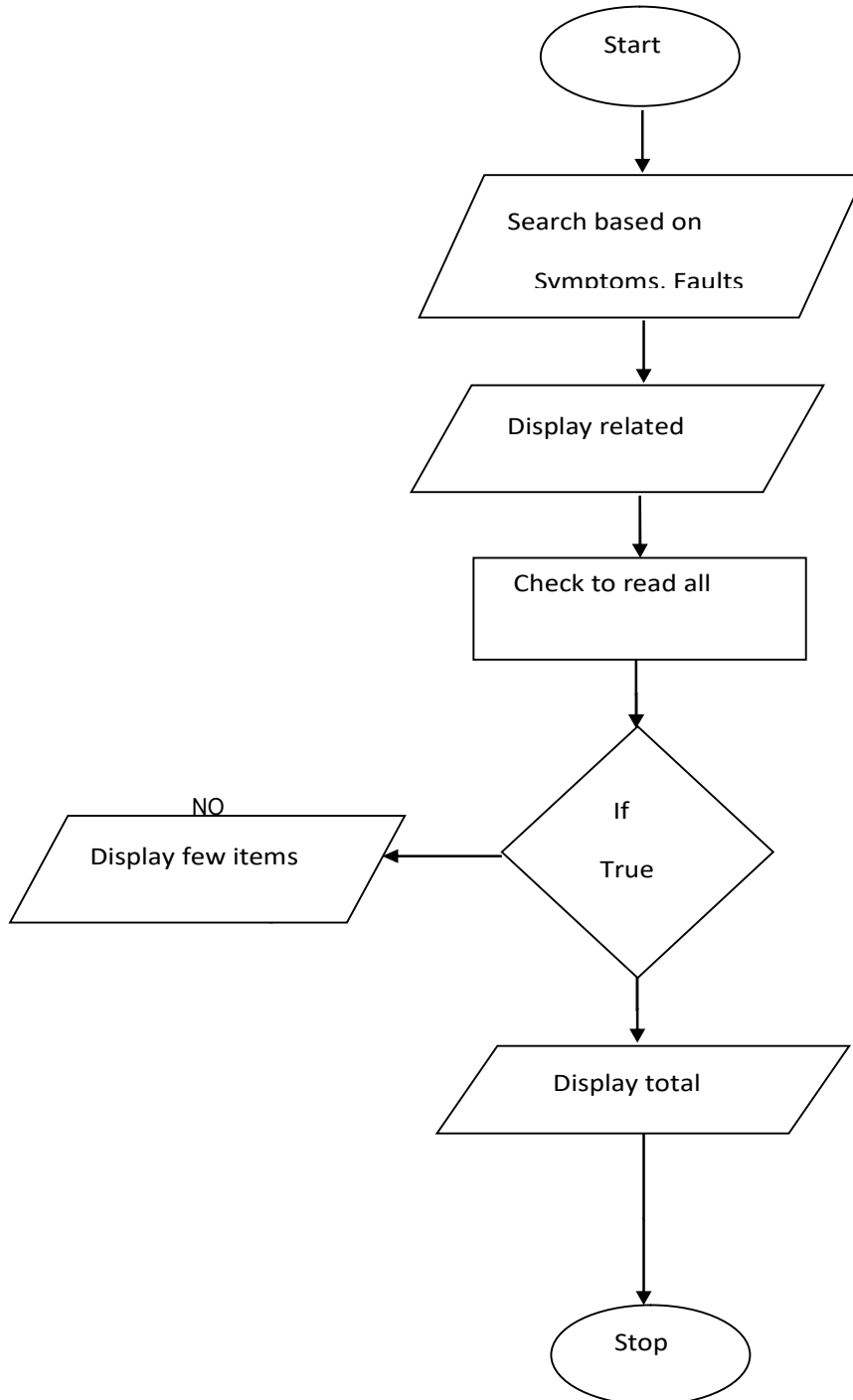


Figure 2: Troubleshooting

Register Admin

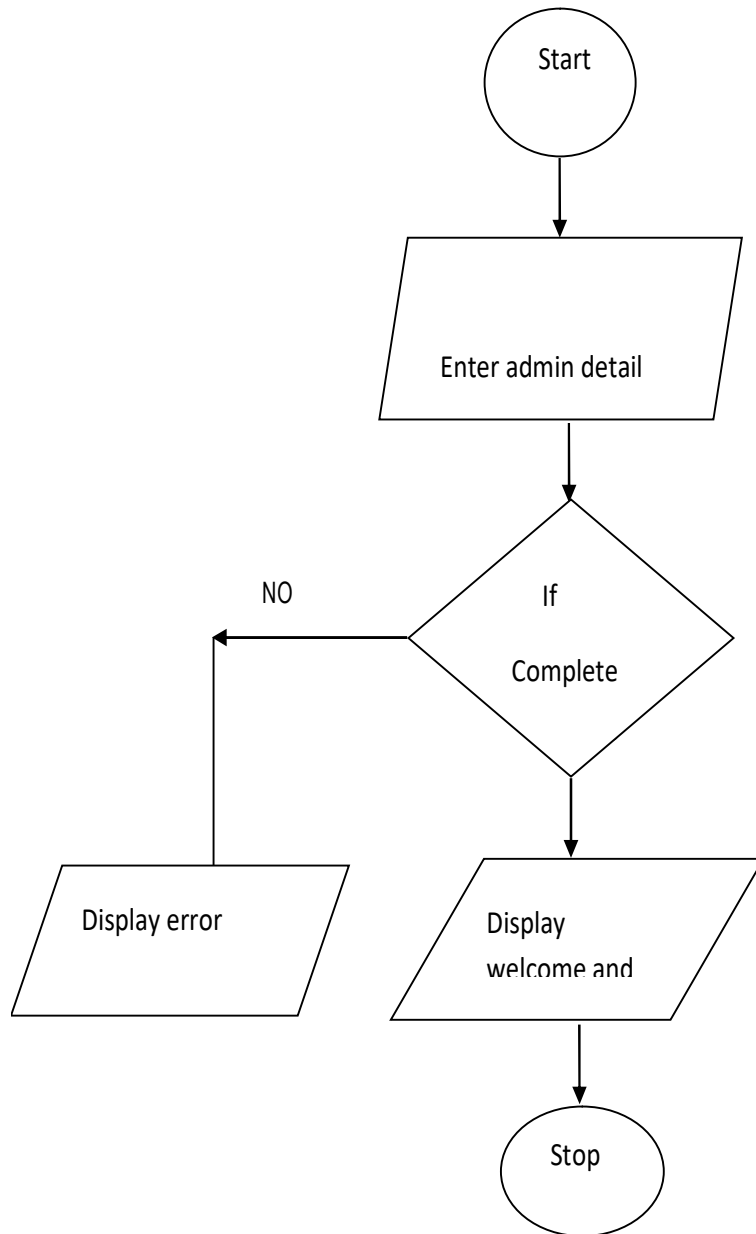


Figure 3: REGISTER ADMIN

Fault Upload

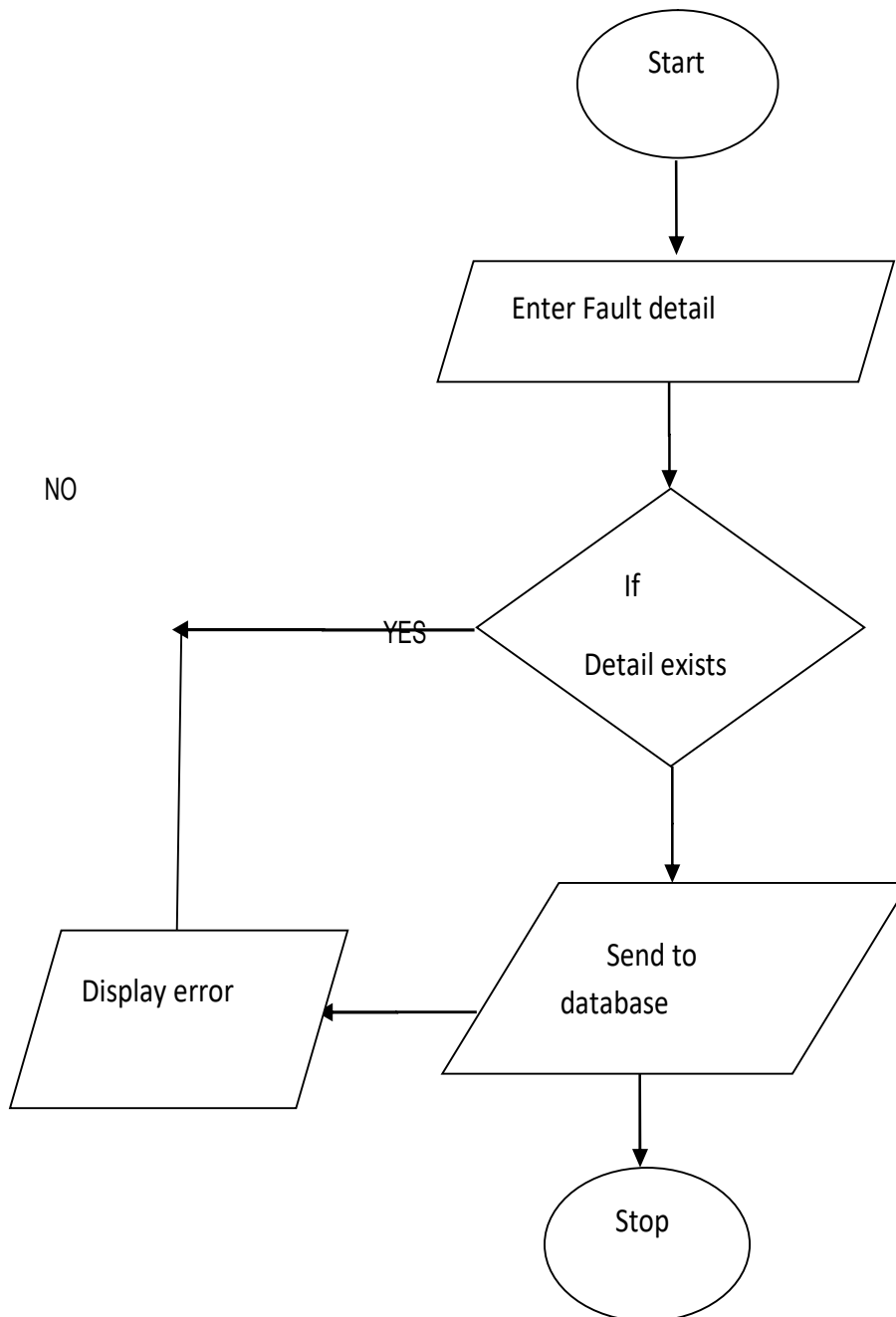


Figure 4: Fault Upload

Table 1 : Faults with Session for Hardware on Techno P3 (Hardware)

S/N	SYMPTOMS	POSSIBLE CAUSES	ACTION NEEDED
1	My ear speaker is not working	The component or the IC is faulty, the ear speaker might be burnt or cut	To change the IC or rework
2	My speaker is not working	The speaker might be burnt or cut	To change the speaker is the solution
3	The person am calling can't hear what am saying	The mouth-piece is faulty	To change the mouth-piece or rework
4	My charging port is not working	The IC is faulty	To change the IC or rework
5	The ringer speaker is not working	The ringer speaker might be burnt	To change the ringer speaker
6	My SD card is not recognized	Expansion card corrupted	To reformat with use of Laptop or Desktop PC
7	My insert Sim is not working	IC or Sim seat damage	To change, rework the IC or change the Sim seat
8	My backlight is blinking	Screen problem or Panel problem on board	To change or rework
9	My torch-pad is not working	The screen is crack	Changing the torch-pad is the solution
10	My power button is not working	Water, liquid and electric surge can cause the problem	Wash session, hard-paste and reworking or to change the power switch
11	The volume button is mal-functioning	The component is faulty	To change or rework
12	My Battery connector is not charging	The IC and component is faulty	To change is the solution
13	Sensor problem	The component is faulty	To change or remove the sensor
14	My battery is weak	Battery damaged	To change the battery is the solution
15	My smartphone Wi-Fi is on and off	The Wi-Fi connection is always on	Locate Wireless & Network Wi-Fi settings. Select advanced and change the sleep policy to Never
16	I run out of memory often	The cache is full	Clean the cache for specific applications to free up memory; to uninstall or move the applications to an expansion card
17	Some of the games play very slowly.	Memory space is running low	Buy memory card that is to 4GB
18	Not able to upgrade my Android phone to a new release	It is not all manufacturers that allow upgrade to the latest Android release.	Changing the ROM is the solution
19	I want to remove applications that were previously installed	It requires rooting the device and then downloading and installing an application called root uninstaller.	Changing ROM is the solution
20	I want to stop viruses from attacking my phone	Through sending of files from one phone to another	Download Kaspersky Mobile Security to secure your phone from threats

Database Name: Expert System

Table 2 : Faults with Session for Software on Techno P3 (Software)

S/N	SYMPTOM	POSSIBLE CAUSES	POSSIBLE SOLUTION
1	My phone is corrupt	Virus or SD card failure	Flashing or formatting the SD card
2	My phone is hanging	Too much of application on SD card or Virus	Delete some app or flashing
3	How do I remove apps	Too many application downloaded and installed	Select Settings / Application /Manage Applications then select the applications to be uninstalled
4	How do I wipe my smartphone completely	Too many data or corrupted on phone	Make use of option in settings(SD & phone storage) for Factory Data restore .
5	I want to hide my search history	Privacy and security purposes	Visit www.google.com/history using Android browser and login.
6	How do I take screenshots on my phone	Improper operation or mis-handling	Pressing of the back key and the home button twice in order to take screenshot

Hardware and Software Specifications

The hardware requirements for the Expert System to run on minimum of the following Intel Pentium III computer with a processor speed of 900MHz on higher, Random Access Memory (RAM)of 128MB, hard disk space of 10MB or more, 101 Enhanced keyboard and PS.2 or USB Mouse. While the software requirements for the Expert System is to run on a browser Graphics and text browser is preferably e.g. Internet Explorer, a text editor and Windows Apache MySQL PHP (WAMP server)

4. CONCLUSION

Technology has shaped the way we leave our lives, and Expert System has been found to be very useful. Extracting and storing can be used to replace expert in event of loss. The development of Expert System for Techno P3 android Smartphone will have greater part of the advantages of expert system, few specialists exist that can troubleshoot and repair the phone. The knowledge of such specialists can be replicated and made utilized in extreme necessity. Computerized system of information supply and assistance to the users of Techno Smartphone has been proven to be viable in this study. However, experience gathered during the course of this study improved if the desired hardware and software resources are made easy available. Establishment of training centers by the Techno Company to train specialist so as train them on the maintenance, troubleshoot and repair of Techno P3.It is recommended that development of expert system mobile applications be developed for trainers and specialists.

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